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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/688,901

10/21/2003

Derrick Kevin To

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06/28/2006

PATENT LEGAL STAFF
EASTMAN KODAK COMPANY
343 STATE STREET
ROCHESTER, NY 14650-2201

EXAMINER

PHAM, HAI CHI

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 06/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,901

Applicant(s)

TO ET AL.

Examiner

Hai C. Pham

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 is/are allowed.
- 6) ☒ Claim(s) 1,3-14,16-21 and 36 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/23/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 1, 3-15 and 36 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1:

- The following limitation “to change a spacing therebetween during imaging” at line 8 appears to be misleading since it is not supported by the Specification, which clearly indicates at paragraph [0021] that the adjustment of the spacing is made before or after [and not during] an imaging operation:

“The adjustment will generally be made before or after an imaging operation and may be executed during a retrace cycle while the exposure heads are returning to a home position on completion of an image.”

(emphasis added).

Moreover, paragraph [0019] discloses that the exposure heads should be “very precisely spaced” and that due to the change of the environmental conditions, “it is necessary to periodically re-space the heads”. In other words, the spacing between the exposure heads is kept constant during the imaging operation. For purpose of examination, although the applied prior art may teach changing the

space between the multiple print heads during imaging, the limitation “during imaging” will not be considered herein until the Applicants prove otherwise.

Claim 36:

- The dependent claim 36 recites the following limitation “the adjustable mechanism is operable to change the spacing between the exposure heads during a retrace cycle” (emphasis added), which implies an opposite to the limitation “during imaging” inherited from the parent claim 1.

Claims 3-15 are dependent from claim 1 above, and are therefore indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1, 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Gamblin (U.S. 4,131,898).

Gamblin teaches an interlacing recorder comprising a media carrier (drum 13) carrying the recording sheet (paper 12), at least two exposure heads spaced apart from one another (print heads 10 and 11 are spaced apart by a distance S) (Fig. 3), each exposure head disposed to image a portion of a single sheet of media (sheet of paper 12) secured on the media carrier, an adjustable mechanism for moving the exposure heads relative to each other to change a spacing therebetween (the distance between the print heads is adjusted such that the full width printed bands interlace at their edges) (see Abstract).

With regard to claim 3, Gamblin teaches the media carrier being a cylindrical drum (drum 13) and the media (paper 12) being secured to an external surface of the drum (Figs. 1, 3).

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Sawano et al. (JP 2000-343779).

Sawano et al. discloses an imaging apparatus comprising a media carrier (platen 22) (Fig. 3) carrying the recording sheet (recording paper Pm), at least two exposure heads spaced apart from one another (print heads 2a, 2b, 2c spaced apart by a distance Xm) (Fig. 1), each exposure head disposed to image a portion of a single

sheet of media secured on the media carrier (each the three exposure heads prints a portion of the continuous line L in the main scanning direction Hh) (English translation, paragraph [0010]), an adjustable mechanism (head spacing modification device section 3) for moving the exposure heads relative to each other to change a spacing therebetween (the distance between the print heads is adjusted based on the detection of the size of the recording paper as detected by the size detection sensor 5) (see Abstract) (English translation, paragraphs [0020]-[0021] and [0028]).

Sawano further teaches joining the portion imaged by each exposure head to form a unitary image (e.g., a continuous line L in the main scanning direction) on the single sheet of media secured on the media carrier.

6. Claims 1, 3, 8, 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Okamoto et al. (Pub. No. U.S. 2003/0048467).

Okamoto et al., an acknowledged prior art, discloses an image recording apparatus comprising two recording heads (2 and 3) each being mounted on a separate lead screw (e.g., ball screws 13) and lead screw nut (not shown) (it is noted that the traveling nut is inherently connected to the drive system, which rotates the lead screw nut for providing a movement of the exposure head along the lead screw) (paragraphs [0031]-[0032]), wherein the spacing between the two recording heads are adjusted so as to be positioned at a predetermined locations relative to each other and with respect to the printing plate based on the type and size of the different printing plates and the divisional image data (paragraphs [0040], [0042]) such that the recording heads

concurrently scan their respective printing areas, the controlled positioning of the recording heads being made once the type of the printing plate and the divisional image data are determined, e.g., at the beginning of the printing operation. Okamoto et al. further teaches the starting positions of the respective recording heads and thus the spacing between the two recording heads being based on the number of the printing plates fixed on the cylindrical drum (1), wherein the positioning of the respective recording heads is determined by the joint gap between the printing plates (paragraphs [0105]-[0106]).

7. Claims 1 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Shibasaki (U.S. 6,938,969).

Shibasaki discloses an image recording method and apparatus, the apparatus having at least two exposure heads (recording heads 34a and 34b), the method comprising loading at least one sheet of media on a media carrier (loading the print sheets 46a and 46b of different sizes via conveyance rollers 52 onto the platen 56), adjusting the spacing between the exposure heads in accordance with the number of sheets and the size of the media loaded on the media carrier (the spacing between the two recording heads being dynamically adjusted during imaging in accordance with the number of the print sheets, e.g., one or two print sheets as shown in Figs. 6B, 6C, and the size of the print sheets as shown in Figs. 6B, 6D), and imaging with each exposure head, a portion of a single sheet of media secured on the media carrier, or one of at least two sheets of media secured on the media carrier (imaging the two print sheets

46a and 46b with the respective recording heads 34a and 34b, which traverse within the set widths based on the size and number of the print sheets).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3-7, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawano et al. in view of Gamblin.

Sawano et al. discloses all the basic limitations of the claimed invention except for the image carrier being a cylindrical drum.

However, it is old and well known in the art that the printing system can be implemented with an image carrier that can be either a platen or a cylindrical drum for holding the recording paper at the printing station as evidenced by Gamblin, which teaches an interlacing recorder comprising a media carrier (drum 13) carrying the recording sheet (paper 12), at least two exposure heads spaced apart from one another (print heads 10 and 11 are spaced apart by a distance S) (Fig. 3), each exposure head disposed to image a portion of a single sheet of media (sheet of paper 12) secured on the media carrier, an adjustable mechanism for moving the exposure heads relative to each other to change a spacing therebetween (the distance between the print heads is adjusted such that the full width printed bands interlace at their edges) (see Abstract).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a cylindrical drum for carrying the recording paper in the device of Sawano et al. as taught by Gamblin since Gamblin teaches this to be well known in the art to carry the recording medium on the external surface of a cylindrical drum.

With regard to claims 4-7, Sawano further teaches:

- Each of exposure head is traversed by a leadscrew nut (ball nut section 34) (Fig. 1) coupled to the exposure head and located on a common leadscrew (ball screw section 33) and the adjustable mechanism (head spacing modification device section 3) comprises a coupling between at least one of the leadscrew nuts and the associated exposure head capable of being displaced relative to the other exposure head (English translation, paragraph [0020]),
- The at least one of the leadscrew nuts is displaceable by rotating the at least one of the leadscrew nuts on the common leadscrew (English translation, paragraph [0020]),
- An auxiliary motor (rotation mechanical components 31, 35) rotating the at least one of the leadscrew nuts in response to signals provided by a controller (control processor C controls the rotation of the components 31 and 35 included in the head spacing modification device section 3 based on the signal obtained from the size detection sensor 5, at the time the invention was made of printing) (English translation, paragraphs [0020], [0028]),

- Each of the leadscrew nuts is rotatable and the common leadscrew is held fixed (Fig. 1) (English translation, paragraph [0020]),
- the adjustable mechanism is operable to change the spacing between the exposure heads during a retrace cycle (the head spacing modification device section 3 adjusts the intervals between the three print heads during the time after the completion of one printing operation and leading to the next printing operation when the size detection sensor 5 detects a recording paper of different size, i.e., at the beginning of each printing operation).

10. Claims 9-14, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. in view of Nakao et al. (U.S. 5,359,434).

Okamoto et al. discloses all the basic limitations of the claimed invention except for the target providing information of the location of the imaging beam along with the position sensitive detector, the target being formed with a pair of lines, being located and held fixed on the media carrier, and being a single common target.

Nakao et al. discloses an image forming apparatus comprising a target (mark 12) for determining the position of a laser beam, the target having a pair of lines on a background, the lines at a pre-determined angle to each other, the lines of contrasting reflectivity to the background (e.g., in Fig. 11A, the mark 12 having at least a line mark 12a and line mark 12b disposed at right angles, the mark being formed on the surface of the photoconductor 1 at a non-imaging region 1b and being formed of a material having a reflectance different from that of the photoconductor, the reflectance of which

is captured by the photo detective element 7) (col. 10, lines 28-45). Nakao et al. further teaches the target (mark 12) being located and fixed on the photoreceptor, and being provided as a single common target for determining the location of the plurality of laser beams (Fig. 18).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the target for detecting the position of the beam in the device of Okamoto et al. as taught by Nakao et al. The motivation for doing so would have been to monitor the position of the laser beam with respect to the scanning area so as to allow for optimal scanning of the exposure head.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. in view of Karz (U.S. 5,587,730).

Okamoto et al. discloses all the basic limitations of the claimed invention except for in the event of failure of one of the exposure head, the imaging is completed by the other exposure head.

Karz discloses a redundant printing head for replacing the faulty printing head for improved reliability.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the redundant printing head in the device of Okamoto et al. as taught by Karz. The motivation for doing so would have been to allow the completion of the image forming operation with interruption and to improve reliability as suggested by Karz.

Allowable Subject Matter

12. Claim 2 is allowed.
13. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
14. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of claim 15 is the inclusion therein, in combination as currently claimed, of the limitation "a speed controller connected to allow a traverse speed of at least one of the exposure heads to be controlled sufficiently precisely to adjust a position of a last channel to within less than one beam width", which is not found taught by the prior art of record considered alone or in combination

Response to Arguments

15. Applicant's arguments with respect to claims 1, 3-14, 16-21 and 36 have been considered but are moot in view of the new grounds of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

Art Unit: 2861

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



HAI PHAM
PRIMARY EXAMINER

June 14, 2006